

Seasonal Variations of Acari and Soil Nitrate

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Abstracts: The population density of acari specially oribatids increases in the months of July and August (monsoon months) when the nitrate content of the soil also increases. It is recorded that the population density of Bacteria, Actinomycetes and fungi increases during monsoon months.

Soil zoological studies on acari have been made by workers such as BLOCK (1966), LOOTS & RYKE (1967), WOOD (1967), AOKI (1967) and ANDERSON (1970). BLOCK (1966) pointed out that temperature limits the developmental period of eggs. Accordingly to BELFIELD (1970) excreta of arthropods may account for sudden flush of nitrate.

Experimental

The sampling site was selected near agricultural farm, Burdwan. The site (area: 10 m×10 m) had not been cultivated since 1965 and was well vegetated.

Soil samples (each 10 m² in surface area) were taken by a steel borer from 0-15 cm depth and mites were extracted in high gradient extraction apparatus (MACFADYEN, 1961). In total 48 soil samples were collected from the sampling plot at weekly intervals over a period of 12 months from January, 1969 to December, 1969. Nitrate was determined by phenol disulphonic acid method as described by DOWDESWELL (1959). Mechanical analysis of soil samples was estimated as suggested by PIPER (1942).

Results and Discussion

Soils of the sampling plot are alluvial and clay loam in texture (Table 2). Population density of Acari and nitrate content of the soil can be summarized as shown in Table 1. Total number of colonies (bacteria, actinomycetes and

Table 1. Mean values of nitrate content of soil (from 4 samples in each month) and mean numbers of acari (from 4 samples in each month)

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Nitrate (ppm)	0.89	0.90	0.88	0.86	0.82	1.23	2.25	2.19	1.35	0.98	0.92	0.90
Cryptostigmata												
<i>Scheloribates albialatus</i> Hammer, 1961	21	15	9	21	15	33	72	65	42	29	26	19
<i>Lamellobates palustris</i> Hammer, 1958	12	11	10	15	13	29	67	61	39	27	24	20
<i>Oppia yodai</i> Aoki, 1965	10	9	8	6	4	28	65	59	38	25	23	18
<i>Tectocephus velatus</i> Michael, 1980	8	10	9	17	5	27	61	60	36	22	20	19
<i>Allonothrus monodactylus</i> Wallwork, 1960	7	9	8	5	3	25	59	55	31	20	18	15
<i>Galumna</i> sp.	5	4	3	2	1	19	35	32	25	21	19	18
Mesostigmata												
<i>Asca</i> sp.	14	15	12	15	12	21	38	31	20	16	11	10
<i>Pachylaelaps dorsalis</i> Bhattacharya, 1970	8	6	5	4	2	12	11	15	10	9	17	5
<i>Gamasiphis bengalensis</i> Bhattacharya, 1966	11	9	8	17	4	13	12	9	8	4	3	6
<i>Macrocheles</i> sp.	—	—	9	—	—	4	10	6	—	—	5	—
Prostigmata												
<i>Allothrombium</i> sp.	5	—	—	1	—	—	4	2	—	—	1	2
<i>Cunaxa</i> sp.	—	—	—	—	—	—	2	3	1	—	—	—
Astigmata												
<i>Tyrophagus</i> sp.	—	—	—	—	—	—	2	1	3	4	—	—

Table 2. Mechanical analysis.

Location	Sampling site (Burdwan)
Sand %	31
Silt %	29
Clay %	40

Table 3.

Dilution of soil.	Micro-organisms	Total no. of Colonies per plate in different months.			
		May	July	August	December
10 ⁻⁵ dilution	Bacteria	14	30	26	20
	Actinomycetes	5	11	9	7
	Fungi	2	6	4	3

Fungi) as mentioned in Table 3.

Total population of Acari fauna shows an irregular trend of fluctuation exhibiting maxima in monsoon months (July and August) and minimum in summer month (May). Total count of bacteria, actinomycetes and fungi also increases in the months of July and August (monsoon months). According to VELDKAMP (1955) certain bacteria and fungi are known to break down arthropod cuticle. KÜHNELT (1963) noted that nitrogen acts as an attractant for arthropods. SALT (1956) suggested that increase in nitrate during rainy season is due to break down of arthropod exuviae by bacterial action. According to BELFIELD (1970) excreta of arthropods which have been lying undamaged in the soil during dry seasons are subjected to rapid bacterial action with the onset of rains. This study shows that the population density of acari increases at the rainy season (monsoon months) with an increase in nitrate content of soil.

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